FISSION WITHIN THE SPALLATION PROCESS. INFLUENCE OF THE INTRA-NUCLEAR CASCADE AND EVAPORATION MODELIZATIONS ON THE FISSION FRAGMENT PRODUCTION

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The spallation process is usually described by two steps. The first one is an intra-nuclear cascade (INC) leading to an excited nucleus and fast particle emission and the second one is a deexcitation phase. The excited nucleus can deexcite by two ways: evaporation of particles (mainly nucleons, but also composites) and possibly fission in the case of heavy residues. Of course, the results depend a lot on the quality of the fission model, but the entrance parameters, i.e. the features of the fissioning nucleus, are obviously important as well. Consequently a precise description of the previous stages, INC and evaporation, is required. Indeed, the excitation energy, fissility parameter and angular momentum which are important for fission are given first by the INC and second by the following evaporation before fission. Using different INC models coupled to the same deexcitation model (ABLA from GSI) we have investigated the influence of these parameters. In particular, we show that taking into account d, t, ^{3}He affects the previous calculated results (mass and charge distribution of the nuclei at the end of the spallation process). The angular momentum plays a significant role in the fission process for some nuclei. The momentum values are different according the cascade model one uses. We tried to understand the reasons and the impact on the fission products for two models that are INCL4 and ISABEL. The excitation energy distribution, which is predicted differently by the two models, is also an important parameter in the description of the fission process. For example, in INCL4 the stopping time of the INC and the emission of d, t, ^{3}He and alpha are parameters which have a large influence on it. For this study we compare also our calculated results to recent experimental data.

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